

opportunity of meeting with this species was on April 5th, 1922, a cold day with even a few snow-flakes falling. To my surprise I found the larvae had been feeding some time, and most of them were in their final cases. It struck me that they might perhaps commence feeding in autumn, not passing the winter in their seed cases. So on October 30th, 1925, I again visited their haunts, on the bank of the Limmat, near Schlieren, west of Zurich.

For some time I searched grass and leaves of *Salvia* for the seed cases and had just concluded that further search would be useless when I caught sight of a small case of *C. ornatipennella*. It was attached to a grass blade that had been mined, but was not the seed case, but that which I had considered as the spring case, made from grass. Afterwards many cases were found, and the large mines showed that the larvae had been feeding some weeks. The grass had also many quite fresh shoots on which the larvae were feeding. The smallest case was about 4mm. long, but two larvae had already made the first addition to their cases.

Several blades of grass were mined from the tip downwards to an inch or more, and at the extremity of a blade so mined I found one of the seed cases of the summer. The brown outer covering of this case was now grey and much wrinkled, and on examination the case proved to be brittle, and it easily broke up. This was the only one I found, those belonging to the other larvae must have already fallen off.

From the number of the grass cases found it may certainly be concluded that it is not the habit of the larva to hibernate in the seed case, as I had at first supposed, but that it leaves this case in the autumn and passes the winter in a new case made from a portion of a grass blade. After the winter the larva must recommence feeding quite early in the spring, and pupate towards the end of April, because the moths are fully out in the third week in May.

I think we may look on this retirement into a case during the hot time of the year as a form of aestivation. Thus the larva can await in safety the time when its favourite grass puts forth new shoots of tender leaves, into which the small larva can mine with ease.

Remarks on the evolution of the Zygaenae and an attempt to analyse and classify the variations of *Z. loniceræ*, Scheven, and of *Z. trifolii*, Esp., and other subspecies. (With Plate VIII.)

By ROGER VERITY, M.D.

(Continued from Vol. XXXVII., p. 158.)

Subspecies *palustris*, Obth.

Race **hibera**, mihi. This is one of the most differentiated and striking races, so that it seems incredible it should not yet have been recorded. The explanation, no doubt, is that the *Zygaena loniceræ* and *Z. filipendulæ* of Spain are extremely difficult to make out and that it is only quite lately the subject has been taken up. Burgeff in 1914 (*Münchner Ent. Ges.*, p. 61) recognised a constantly five-spotted race of *filipendulæ* from the Sierra Segura in Southern Spain and named it *gemina*. I possess it from La Garriga (Barcelona) and Querci in 1924 collected a large series at Orihuela (Sierra of Albarracin in Aragon), where it flew mixed with the race of *loniceræ* I have described

as *intermixta*, already very variable in itself, so that it has been quite a task to separate the two species. A still more instructive example is afforded by the mistake I made in 1921 in dealing with *Z. filipendulae* (*Ent. Rec.*, p. 84). I said I had received from Oviedo in the Asturias a large series of *Zygaenae*, which answered perfectly Oberthür's description of *seeboldi* from Bilbao (*Ét. Lép. Comp.*, IV., p. 543) and that on the strength of the specimens before me I could not agree with him that it was a *filipendulae*, but that it must be a *loniceræ*, with individual variations having quite the build and aspect of *trifolii*. Since then I have received an exactly similar series from Cuenca, m. 1400, in Nueva Castilla, and I have often looked at them, wondering how Oberthür and I could have judged them so differently. It was only last year that the truth dawned upon me and that the explanation was we were both right! My mistake lay in the fact that I had not detected that in my series there were a few *filipendulae* mixed with a majority of *loniceræ* and so exceedingly similar to them that it was most difficult to separate them. Evidently Oberthür's specimens from sea-level were probably all *filipendulae*, but his description of the local features applies to both species, except in regards to the six-spotted individuals, which in my series only exist in one female from Oviedo and in one male from Cuenca. The thick, heavy build of body, antennae and wings, the deep saturated tone of the dark scaling as well as of the bright carmine one and the peculiar tinge of the latter, warmer (less crimson or wine-coloured) than in the other races, are characters which both species exhibit equally. As to the characters by which one can separate the two species in these series, the only one which I have found to be constant is the indigo blue sheen on underside of *filipendulae*. In *loniceræ* there is never more than a slight trace of it on the forewing in a few individuals and never any on the marginal band of the hindwing; usually they are both quite dull. The following features can only be relied on when several point to the same conclusion. In *loniceræ*: antennae shorter and thicker between club and root; wings broader in the middle, between costa and tornus (this character is very conspicuous in the large *palustris*-like individuals, but does not exist in the small *trifolii*-like ones); scaling slightly more translucent when viewed against the light; sheen on upperside lesser; carmine spots much larger on upperside in *palustris* individuals, but by no means so in *trifolii* ones; dark band of hindwings broader on an average and more even in breadth, but with many exceptions; on underside carmine spots, on the contrary, as a rule, lesser in extent and with a lesser tendency to flow together than in *filipendulae*, although they are less sharp in outline than in true *loniceræ*. This is one of the reasons for which I place this race in the *palustris* subspecies, although its antennae are often longer and more pointed than in nymotypical *palustris*. In this and other respects variation, however, is great. Some of my specimens are perfect *trifolii*, resembling *syracusia*, except for their heavier build and peculiar *seeboldi*-like colouring. I should designate them as form **hiberuncula**, which some day will probably be found to constitute a race in particular localities. I already notice that from Cuenca I only have one male against eight of *hibera* and one transitional female against eleven, whereas from Oviedo I have five against seven and

three females against three; evidently the much more damp Asturian mountains produce the *trifolii* structure more often than the dry Sierra of Albarracin.

Race *palustris*, Obth., *Ét. Ent.*, XX., p. 44-46, pl. 8, f. 151-3 (1896) = *major*, Tutt, *Ent. Rec.*, IX., p. 88 and 167 (1897). "Types" from Rennes in N.W. France. Extends to the north of France, the north of Germany and to England, whence Tutt described it a year later than Oberthür under the name of *major*. Both these authors agree that some of the English races (Isle of Wight, Freshwater, etc.) are identical with the French one. In my introductory remarks, p. 119, I have already described the characteristic structure of antennae and wings, different both from *trifolii* and *lonicerae*. In the table of races I show its position as regards the extent of dark and red pattern. I need only add that it is one of the few races which produces a sixth spot on the forewing (*sæmaculata*, Obth., *l.c.*). As to its size, Tutt's name would have suited the nymotypical race, but I must point out the fact that there exists in England also the following.

Race **palustrella**, mihi. This is perfectly identical with the giant (33-39mm, of expanse from tip to tip) *palustris* of Rennes, in every respect, including structure, colouring and markings, but it is much smaller in size (28-32mm.) and its wings are slightly shorter and more rounded at apex. My typical series was collected by T. Grosvenor in Surrey, on the 5th and 7th of June, 1922, and very kindly presented to me by him together with the splendid material I will deal with later.

Subspecies *seriziati*, Obth.

Race *seriziati*, Obth., *Ét. Ent.*, I., p. 33 (1876) and III., p. 41, pl. V., fig. 7 (1878) and XIII., p. 21, pl. VIII., fig. 71-3 (1890).—Not having sufficiently large series of this insect at my disposal, I do not profess to discuss its position thoroughly. Tutt's impression was that it is a *palustris* and I agree with him in connection with the largest and most highly characterised specimens, although some seem to range still further and to be, near *trinacria*, parallel even to *lonicerae*, whereas the small individuals seem to come very near to *australis*. This African *palustris* from the littoral region of Algeria (Bona to Collo), would thus vary in very much the same way as the Spanish race *hibera*. In *seriziati*, however, the highest degree of melanism as a normal variation is reached; no other *lonicerae* is as dark on the whole, because here form *nigra*, Dziurz., with the hindwing entirely invaded by the dark scaling of the marginal band, is quite common.

Subspecies *trinacria*, Vrty.

Race *trinacria*, Vrty., *Bull. Soc. Ent. France*, 1917, p. 222.—In Sicily there exist four markedly different forms: One is very small, its antennae and wings are very rounded at apex, so that it belongs distinctly to subspecies *trifolii* and it falls broadly-speaking, within its race *australis*; I will describe it as **paraaustralis**. Another is *syracusia*, Zell. A third is a little larger and the antennae and wings are a little more pointed, but it still is a *trifolii*: *siciliae*, Vrty. Finally there is the very large *trinacria*, which at first sight one would think might

belong to sub-species *lonicerae*, as compared with the former. As a matter of fact I originally described it as such. Now, however, I have gone more thoroughly into the differences of these insects, I am perfectly convinced *trinacria* is a *palustris*, notwithstanding the longer and thinner antennae of some individuals than in the other race I group under this subspecies. Its wings have the broad *palustris* shape, the pale crimson spots of forewing are very large and the third and fifth are often actually connected by a streak (form *krügeri*, Ragusa, *Boll. Lab. Zool. Portici*, Dec. 1924, p. 88) or a minute dot between them represents the latter (form **punctonotata**, mihi.); on underside they spread still more; the marginal dark band of hindwing is always broad and it may even cover half the distance between the end of the cell and the margin. My "types" are from Lupo, south of Palermo, sent for examination by the late Ragusa, and now they are in the Rothschild collection. Turati has kindly sent me some collected by Krüger on the Madonie at 1400 m., on July 1st.

(To be continued.)

A New Use for Ants.

By MALCOLM BURR, D.Sc., F.E.S.

In Northern Siberia there are immense areas of forest which are inhabited only by a few wandering Tungus. These are a race of hunters, related to the Manchus, and it is believed that they once inhabited a more genial, southerly region. But at present they are mere nomads, dependant entirely upon the chase for their existence. They have, however, certain characteristics which have given plausibility to the theory that they once had a higher culture, but, driven into the inhospitable north by more powerful nations, have retrograded. One of these relics of a former civilisation is their strange intolerance of vermin, a characteristic that might well be copied by many civilised peoples, in Europe as well as in Asia. They object to the presence of various parasitic insects in their primitive abodes, and have an original way of getting rid of them. About the end of September, they collect an ant's nest and bring it into their huts. The ants quickly exterminate the vermin, and the intense winter frosts then soon cause the ants to disappear, so that these practical myrmecologists can enjoy the warmth of their primitive homes in peace.

SCIENTIFIC NOTES AND OBSERVATIONS.

A DAY'S WORK IN THE LIFE OF A WASP.—Whilst writing at my study table on August 22nd, 1925, I noticed a worker wasp which had come in at the window, hovering over and flying down into a small jug which contained honey with which to feed my ants. Only a